

History of the SMART Centres

Henk Holtslag and Reinier Veldman, SMART Centre Group (2022)



The
SMART
Centre
Group

Training the local
private sector in
Simple, Market based,
Affordable and Repairable
Technologies

Background

SMART Centres train the local private sector in developing countries in Simple, Market-based, Affordable, Repairable Technologies, (SMARTechs) for water and sanitation. Examples are different manual well drilling technologies, EMAS and rope pumps, solar pumps, water storage tanks, groundwater tube recharge, household water filters, SaTopan latrines, and others. SMART Centres are hosted by a local NGO or government and train in technical aspects like drilling, producing drill sets and pumps, installation and maintenance. There is also training in business skills like management and marketing. Trainees are selected based on motivation, skills and entrepreneurship. The educational level of a person is less a condition. The experience has been that those with limited education are sometimes the most successful and hard working.

SMART Centres are member of the SMART Centre Group and have a kind of a franchise model.

To become member of the group conditions apply. See document on membership.

The host organization of the SMART Centre Group is the social enterprise MetaMeta based in Wageningen, Netherlands.

Vision and actions

The vision of SMART Centres in short is “water, sanitation and food for all”. The action to reach this is the **SMART approach**, a combination of SMARTechs and a focus on aspects like:

- **Household water filters.** As a first and very cost-effective option for safe drinking water
- **Local production.** Where possible produce drill sets, pumps etc. with local materials
- **Family Based Management.** A family responsible for management instead of a community
- **Well clubs.** Families drilling their own well with guidance of a trained driller
- **Supported self-supply.** Stimulate families to invest in their own well, eventually with subsidy

The **SMART approach** creates a sustainable commercial supply chain of affordable water and sanitation technologies. For instance when boreholes can be made with manual drilling tools, small communities can be reached where machine drilling rigs cannot enter or where they are too expensive. If hand pumps can be produced locally they also become affordable for families. For example of the 200.000 EMAS and rope pumps worldwide over 70% are **self-supply** so paid by families themselves. The local production guarantees availability of skills and spare parts, essential for maintenance and reduces the need for import. SMART Centres help; *not with a fish but with a fishing rod andskills to produce the fishing rod*. The long-term goal is to “disappear”, for instance by transferring knowledge of SMARTechs on to national vocational education systems.

Location of SMART Centres

There are centres in Tanzania, Malawi, Zambia, Mozambique, Niger, Ghana and Nicaragua and starting in Ethiopia, Kenya and South Sudan. The centres are hosted by an existing entity like an NGO or government and they are coordinated by the social enterprise MetaMeta.

<https://metameta.nl/>

Photo; SMART Centre in Malawi



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Actions and long term goal of SMART Centres

Actions to assist in reaching the vision includes the building of local capacity with innovative technologies and approaches. The result is sustainable commercial supply chains of affordable water and sanitation technologies including options that are affordable for lower income families. SMART Centres help; *not with a fish but with a fishing rod andskills to produce the fishing rod*. The long-term goal is to “disappear”, for instance by transferring knowledge of SMARTechs on to national vocational education systems.

Business model of SMART Centres

Rather than a business themselves, SMART Centres create businesses for others. Trained entrepreneurs improve their existing business or start a new business. They sell products and services after the training stops so there is a “profit-based sustainability”. An example: Laban Kaduma was a plumber when he was trained by the SHIPO SMART Centre in Tanzania 12 years ago. Now his company [UVINJO](#) in Njombe employs 2 to 5 drilling teams (6 to 20 people), has drilled over 2.000 wells and installed even more rope pumps, mostly sold to families. Laban is an exception as not all trainees become successful, but similar developments take place in Malawi, Zambia and other countries.

Income of SMART Centres

Some SMART Centres offer consultancies in designing water systems or trainings in specific technologies such as selecting and installing solar pumps or performing geophysical surveys for drill site selection. Participants (mostly technicians of local NGOs) pay a fee which in general covers the cost of the training but does not generate enough income to run a Centre. Another (short term) income is selling new products like water filters, SaTo pan latrines or solar pumps that are not yet locally available. However once there is a demand and proven market, the sales of products is handed over to the private sector.

The largest income generating action is installation of rural water supply systems. The work is subcontracted to trainees /entrepreneurs that were trained. In this way the centre can work on quality control and long-term coaching. It would be possible that Centres generate income by producing and selling SMARTechs like rope pumps themselves. However that would compete with the entrepreneurs they are of have trained so **in the long term this is counterproductive**.

Cost of SMART Centres

The cost to start and run a SMART centre depends a lot on the situation.

For instance if there is not yet an infrastructure the building and contents of a basic training workshop with tools, jigs for production, installation of a demonstration field etc. will cost 50.000 to 150.000 USD. To run a SMART centre requires at least a manager/ trainer and eventually additional staff for administration. Also funds are needed for running a (small) office, transport, training sessions, installation of SMARTechs in show case areas, promotion etc.

Cost of these range from 70.000 to 250.000 USD / year.

The impact of the SMART Centres

Results of the existing SMART Centres until now are:

- 12.000+ rope pumps installed. Over 60% self-supply (100% investment by the user)
- 4.000+ wells drilled mostly for subsidised communal water supply systems
- 80 small companies established, employing 200 technicians
- 1 million+ people with water access
- Actions go on after training stop, companies are working independently.

Description of SMART Centres.

Tanzania

The first SMART Centre started in 2006 in Njombe in Tanzania at the organization SHIPO (Southern Highlands Participatory Organization). An indication of results since its start;

- Number of people trained 160
- Number of companies/ people who produce sell SMARTechs: 40-50
- Number of wells drilled with SMARTechs: 4000
- Number of rope pumps installed (Incl. on hand dug wells): 12000 - 18000
- Number of people reached with SMARTechs: 0.7 to 1 million

SHIPO was founded in 1997 by Walter and Ester Mgina with the objective to solve endemic problems that lead to poverty. SHIPO expanded with support from the Dutch organisation Connect International (CI). In 2000 at the 2nd World Water Forum in The Hague, the director of CI (Tom de Veer) learned about rope pumps and manual drilling (rota sludge) in Nicaragua via Gert Jan Bom and Henk Holtslag who in 2001 started the Practica foundation and who started with trainings in Rota sludge well drilling and rope pumps in 2002. In the period 2003 - 2008 SHIPO realised a large WASH program coordinated by CI. Funds came from DGIS via the TMF program

This so called TAZAMO project took place in Tanzania, Zambia and Mozambique. Part of the project was the installation of (subsidised) communal wells in rural communities and schools. Over 1200 wells were drilled manually and combined with rope pumps, mostly in the Njombe region.

In 2006, SHIPO constructed a new office with a trainings workshop and a large demonstration field for water and sanitation technologies. This was the first SMART centre.

Later on NGOs like Simavi, Winrock and others contracted SHIPO to install wells in several regions.

An interesting effect of the TAZAMO project was that the **subsidised communal pumps created a market for self-supply**. Families, mostly in peri-urban areas in Njombe, Morogoro and other cities who saw the communal rope pumps, bought pumps for their own hand dug wells directly from pump producers. Another effect is “copycats”. Local metal workers, without training by SHIPO, copy the rope pump and sell them to families. Sometimes the quality is good but also there are bad quality pumps. Still there seem to be so many good quality rope pumps that the image of the rope pump is still OK. It is estimated that by 2021 over 7000 families in peri urban and rural areas in Tanzania bought a rope pump without any subsidy.



Training in manual well drilling



Training in production of rope pumps

The SHIPO SMART centre now has a range of technologies in the demonstration field like Underlining, well pipe, Tube recharge, wire brick tanks, a wind rope pump, a pedal rope pump, rope pump model 2, 3 and 4, solar rope pump, solar pumps, drip irrigation, latrines, and several models of water filters. So called “Wow visits” are organised to show these to NGOs and local government. In total the SHIPO SMART Centre trained some 160 people and some 50 people/ small companies now drill wells and/ or produce rope pumps. See also list of trainees, wells pumps.

One of the success stories is Laban Kaduma. When he was trained in 2003 he was a plumber who had a bike. Now he has a car and his company Uvinjo employs 5 to 15 people depending on the season. They have drilled some 2000 wells and produced some 2500 rope pumps.

Nicaragua

A SMART Centre “avant la lettre” started in 1991 in Nicaragua” after a DGIS / SNV project with windmills for irrigation with a production capacity of 200 windmills per year. The project failed completely. After 4 years a total of 17 windmills were produced and production of windmills stopped as soon as the funding stopped. In short reasons were that the windmills had many imported parts and were complicated to produce, install and maintain. With a cost of 4000 USD they were very expensive for medium scale farmers. With the lessons learned, the technical advisor in this project (Henk Holtslag) and local colleagues went on after this project, started the company Aerobombas de mecate (AMEC) and went on with the rope pump that was already promoted, for instance in a SNV program. This pump had 100% local materials and with 100US\$ was affordable. AMEC developed the galvanised model rope pump but also other rope pump models powered by pedals, horse, engines and wind. They assisted local technicians and companies in producing rope pumps and the local production of ceramic pot filters with Potters for peace. In 1997 they introduced the **rota sludge drilling** from India via the Practica foundation. All technologies were installed on the Demo site at premises of AMEC in Managua. Also due to the company BOMESA, the rope pump became a success and by 2005 there were some 10 small and larger companies producing these pumps. It became a national standard pump for rural water supply and by 2005 an estimated 70.000 pumps were installed both on subsidised rural communal wells and boreholes to 50 m deep but mostly for partly or complete self-supply for peri urban families, farmers and rural families.

NB. Henk Holtslag was in Nicaragua from 1987 to 1998 and still visits Nicaragua every 2 years. In 1998 he returned to the Netherlands and from there started to transfer SMARTechs to Africa via short missions and via organizations like Pumping is life (Ghana), Practica, DAPP, ADPP, Winrock and MetaMeta (Tanzania, Zambia, Mozambique, Malawi, Angola and India), via WaterAid (Sierra Leone), and via MWA and IOM (Ethiopia)

SMART Centre Malawi

The SMART Centre here started in 2012. An indication of results since its start;

- People trained: 100-120
- Companies/ people now producing SMARTechs: 30-40
- Wells drilled with SMARTechs: 800-1000
- Rope pumps produced: 1200-1500
- People reached with SMARTechs: > 100.000

The centre in Malawi started after a visit of a group of people from Malawi guided by Jim McGill, the WASH advisor of the Development Department of the CCAP (SOLDEV), a large faith based organisation in Malawi. The centre started at the University of Mzuzu and among others was supported with funds for a training centre from UNICEF, supported by John Pinfold, a strong promotor of self-supply. Due to different visions, the SMART Centre moved to the premises of Wells for Zoe in 2014 and build up a large demonstration site with some 20 SMARTechs including options like the Afridev, Canzee and Mark 5 pumps. Since 2013 there have been yearly training courses for drillers and pump producers with trainers like Laban Kaduma, the master driller from Tanzania. In cooperation with the SMART Centre Group, a SMART Symposium was organised in 2018 where people from other SMART Centres and organisations like SKAT and local organisations discussed cooperation, lessons learned and future plans. In cooperation with the EMAS group the centre organised a training in Technologies for self-supply in 2021.

Funding for training and installation of wells and pumps came from Rotary clubs in The Netherlands, Aqua for All, other donors and local clients.

History SMART Centres

SMART Centre Mozambique

The SMART Centre here started in 2014 and a rough indication of results since its start

- People trained in SMARTechs: 20 - 40
- People trained in agriculture via Farm clubs 200-300
- Wells drilled with SMARTechs: 70- 100
- Rope pumps produced: 100-150

The centre was started by mr Bachir Afonso, who was trained in 2007 in Tanzania, and who started the organisation GSB (Grupo de Sanamento de Bilibiza) together with mrs Tcheizi Mutembo. A workshop and training centre was constructed in Bilibiza, 4 hours north of Pemba, and trainings were given in SHIPO drilling, Mzuzu drilling and rope pumps but also in repairing Afridev pumps, building, latrine slabs and water filters. Other actions of GSB include improving agriculture and they train so called Farm clubs, groups of 50 lead farmers, who are trained by doing and growing crops in communal plots.

Sadly, in 2020 the buildings of the SMART centre in Bilibiza were destroyed by rebels and since than mr. Afonso and his family are missing.

GSB is going on with activities in resettling camps around Montepuez, south of Pemba, which is a safe area. Funds come from organisations like Arrakis, Rotary clubs, Aqua for All, Marie stella Maris.

SMART Centre Zambia

The SMART Centre here started in 2016 and a rough indication of results since its start

- Technicians trained in SMARTechs: 35 – 40
- Companies/ people who produce sell SMARTechs: 30 - 35
- Wells drilled with SHIPO drill >400
- Rope pumps produced: >460

The centre was started by the organisation Jacana managed by Rik Haanen and his wife Dinie Nijsen. Both worked around 2008 as managers of the SHIPO SMART Centre in Tanzania. After experiences with less effective projects in India, Kenya and Zambia, they decided to do it different and started the organisation Jacana in Chipata in East Zambia. The Jacana SMART Centre has a strict selection of people to be trained and mainly install pumps with Family Based Management, so the well is installed at premises of 1 family who owns the well. Experience is that families with a wells serve an average of 50 other people who often get the water for free or pay in kind.

So **“Family owned pumps serve small communities”**. The installation of 310 subsidised wells/ pumps in so called “Show case areas” created a market for self-supply and already 130 families paid wells and or pump 100% themselves. Besides technical skills, Jacana has a focus on the training in Business skills and gives long term coaching to businesses. A result of the actions of Jacana is that drillers are member of a drilling group and recognised by the national WARMA (Water Resources Management Authority).

Fund for Jacana are from Aqua for All, Marie Stella Maris, Transform International, Rotaries ao.

SMART Centre Ethiopia

The SMART Centre here started in 2017 A rough indication of results since its start

- Technicians trained by the centre in drilling and pumps 20
- Companies/people who produce/ sell rope pumps 10-20*
- Total number of rope pumps produced in Ethiopia 20.000-25.000*

The SMART Centre here is hosted by EWTI (Ethiopian Water Technology Institute) which is part of the Ministry of Water. The centre started after a national event on self-supply organised by Aqua for All in Addis Abeba.

The EWTI SMART Centre is still in development and a few trainings took place among others in 2018 for IOM. Scaling self-supply is part of the national policy to reach SDG6 in rural areas. EWTI is head of a Task group for self-supply so may have an important role in the future. On a demonstration field a range of options are installed and often people of NGOs en Government visit this demo field. Funds until now come from EWTI itself and the SMART Centre Group.

* The high number of rope pumps produced is not a result of the actual SMART Centre but started in around 2006. Than organisations like IDE, JICA and WaterAid with technical support of the Practica foundation introduced a AMEC rope pump model in Ethiopia. Local metal workshops were trained in production and the pump became so popular that untrained workshops also started to produce and sell the pumps. By 2012 there were some 10.000 rope pumps produced and mostly given away. (Mekonta 2014). Part of the pumps and /or installation was of poor quality resulting water to leak back in the well, causing recontamination. In 2013 the government of Ethiopia decided to improve and standardize the Rope pump and did so with support from JICA and MetaMeta. In 2014 local government in Amhara ordered 10.000 rope pumps for self-supply. However part of these pumps are still in stores since the demand for full self-supply was never created and pumps are still relatively expensive for poor families. Another problem was that initially the program did not include training in good quality well covers. This has lateron improved with support of JICA. A national policy now is to assist in the goal “water for all” in rural areas by upscaling of self-supply and the rope pump is seen as one of the tools to reach this goal

SMART Centre Nicaragua

The SMART Centre here started in 2018 with support of the organisation WaterAid and a rough indication of results since its start

- Technicians trained in SMARTechs incl. sanitation: 100
- Companies/ people who produce sell SMARTechs: 10-20*
- Rope pumps produced 70.000 - 100.000*

The centre was initially under auspices of the organization WaterAid and Joshua Briemberg who in cooperation with AMEC started this centre outside Managua. Besides water there is a focus on sanitation marketing and emphasis on supply chains and delivery models. The centre has a range of SMARTechs on display and organizes trainings for NGOs and Government.

There is cooperation with the Nicaragua Water and Sanitation Network (RASNIC). They also introduced the multi-stakeholder Technology Applicability Framework TAF in Nicaragua.

*The high number of rope pumps produced is not a result of the actual SMART centre but started in 1990 as described above. Via local companies like BOMESA, taller Electro mecanico, AMEC and some 7 smaller companies an estimated 70,000 rope pumps were installed by 2005. AMEC who started in 1991, developed the galvanized rope pump model but also rope pumps powered by pedals, horses, engines and wind.

The shift from imported piston pumps to rope pumps increased rural water supply by 23 % in the period 1995 to 2005, much faster than countries that applied imported hand pumps (Alberts 2003). Users do the maintenance and over 90% of the Rope pumps remain in operation (IRC 1995).

The rope pump was adopted as the standard hand pump by the government. About 80% of the rope pumps in Nicaragua are used by one or a few families. An extensive survey at 4600 rural families indicated that a well for farm families increased incomes by an average of 33% and a (rope) pump on the well again increased annual incomes on average of 225 US\$ as compared with families without a pump on a well. (Zee. 2002). This is explained by the fact that a well is time saving for women and a pump is faster than a bucket and can provide water for gardening, animals and increased hygiene so reduced health related cost.

SMART Centre Ghana

This centre here is hosted by the organisation Pumping is Life (PIL) and started as a SMART Centre in 2020. Effects of PIL include;

- Number of technicians trained in drilling and rope pumps 10
- Number of companies drilling wells, producing rope pumps via PIL 3
- Number of rope wells drilled and pumps produced via PIL 350
- Number of companies producing rope pumps via others 3-5
- Total number of rope pumps in Ghana. 3500-4000*

The host organisation, exist since 2000 when they started with the improved rope pump model from Nicaragua. In 1999 the rope pump was introduced by BOMESA from Nicaragua but 80% of the 200 pumps installed did not function anymore after 1 year. Reasons where lack of funds for long term follow up, errors in installation and lack of maintenance.

The Pump introduced by PIL was a better quality with a galvanised pump structure and over 400 pumps were installed on manual drilled boreholes. * The large number of rope pumps was installed via the Victoria foundation from the Netherlands (Jan Mons). He trained local welders in a short based rope pump model for hand dug wells and over 3500 were installed in northern Ghana and Togo. Pumping is life is now very active in installing solar pumps. Funds for PIL come from Rotary clubs in Netherlands, ICCO and others

SMART Centre South Sudan

The SMART Centre here started in 2018 and an indication of results since its start

- Number of drillers, technicians trained in SMARTechs 12
- Number of companies/people who produce sell SMARTechs: 1

The centre was started by Mr Jim McGill who was manager of the SMART Centre in Malawi. The opening of the centre was done by the minister of water mr Peter Mahal who stressed the need for building local capacity and need for low cost water and sanitation options for the rural areas. The centre had many challenges and it took 3 attempts before it found its current location. There are internal problems in the host organization (PRDA). Another limitation is that in the area of Juba it is difficult to drill wells with manual tools due to the hard rock layers. There are ideas to shift the centre from Juba to Wau where drilling is easier. Funds come from the Presbyterian church and other small donors

SMART Centre Niger

The SMART Centre here started in 2019 and an indication of results since its start

- Women trained in hand wash tools (dip tap, Wash bottles); 120
- Welders trained in wash stations and Mzuzu drill 10
- Masons trained in Sanitation platforms 10
- Rope pumps produced in Niger by companies trained before 400-600*

The centre was started by Mr Jim McGill who was manager of the SMART Centre in Malawi.

The SMART centre has had limitations due to problems with jihadists; for instance travelling outside Niamey is not allowed. The Centre builds on experiences in Niger with manual drilling by organizations like EnterpriseWorks/VITA, and the Lutheran World Relief.

In the period between 1996 to 2008 over 16.000 wells were drilled manually in the area of Galmi for small scale irrigation. The large number of rope pumps were produced by companies trained in the years 2010 by organization Winrock. The SMART centre now has a focus on sanitation and options for pit emptying, introducing the Gulper, Rammer, and Sludge Digger.

The centre intends to start up a Sahel development hub in cooperation with other organizations. Funds for the centre come from the Presbyterian Church (USA), individuals, Wilde Ganzen Netherlands and others.

History SMART Centres

SMART Centre Kenya

The centre started after the director of ACK participated in the SMART Symposium in Malawi. The technician of ACK participated in the Training on self-supply technologies in 2021. In May 2022 there will be a similar training at ACK which probably will scale up activities

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Authors

Reinier Veldman, Coordinator SMART Centre Group

rveldman@metameta.nl

Henk Holtslag, Technical advisor

henkholtslag49@gmail.com

Websites:

www.smartcentregroup.com

www.metameta.nl

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Information on Centres

<p>Tanzania – SHIPO SMART Centre</p> <p>Address: Njombe Host organisation; SHIPO Start Centre: 2006 Number of people; 2 Manager: Leire Diez Larrea; E-mail: leire@shipo-tz.org Tel; +34 676 03 62 46 Website: www.smartcentretanzania.or.tz Social Media: https://www.instagram.com/shipo_tanzania/ https://www.facebook.com/shipotanzania/</p>	
<p>Malawi – CCAP SMART Centre</p> <p>Address; Mzuzu Host organisation; CCAP, Development Dept. Start of centre: 2012 Number of people; 2 + 5 part-time Manager: James Mhango E-mail: jamemhango@gmail.com Tel; +265993845045 Website; www.smartcentremalawi.com Social Media; https://www.instagram.com/smartcentremalawi/ https://www.facebook.com/SMART.Centre.Mzuzu/</p>	
<p>Mozambique - GSB SMART Centre</p> <p>Address; Bilibiza, Cabo del Gado, Host org. Grupo de Sanamento de Bilibiza (GSB) Start of Centre: 2012 (the training centre was destroyed in 2020 by attacks) Number of people; 4 Manager: Tcheizi Mutemba tcheizi.mutemba@gmail.com Website: www.smartcentremozambique.com</p>	
<p>Zambia – Jacana SMART Centre</p> <p>Locations; 3 centres. Chipata, Lundazi, Petauke Host organisation; Jacana Start of Centre: 2016 Number of people; 6 Manager: Rik Haanen E-mail: rik.haanen@jacana.help Tel: +260 96 7586588 Website: www.smartcentrezambia.com Social Media: https://www.youtube.com/c/JacanaHelp https://www.facebook.com/jacana.help?_rdc=1&_rdp</p>	

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<p>South Sudan - PRDA SMART Centre (starting)</p> <p>Location; Juba Host organisation; PRDA Start of centre: 2019 Number of people; 1 Manager: Jim McGill, E-mail: mcgillwatsan@gmail.com Tel: +227 92 47 80 30 Website: Under Construction</p>	
<p>Niger; EERN SMART Centre</p> <p>Location; Niamey Host organisation. Eglise Evangelique de la Republique du Niger (EERN) Start of centre: 2020 Number of people; 3 + 2 part time Manager: Jim McGill, E-mail: mcgillwatsan@gmail.com Tel: +227 92 47 80 30</p>	
<p>Ghana; PIL SMART Centre</p> <p>Location; Wale Wale Host organisation; Pumping is life Start of centre: 2020 Number of people; 2 + 4 part time Manager: Yussif Abdul-Rahaman E-mail: yussif.abdul@gmail.com Tel: +233541299790 Website; https://www.pumpingislifewash.org/</p>	
<p>Nicaragua; SMART Centre</p> <p>Location; Managua Host organisation; Start of centre: 2019 Number of people; 2 Manager: Joshua Briemberg E-mail: jbriemberg@gmail.com Tel: +50588370770 Website: https://www.wateraid.org/us/story/SMARTCenter</p>	

<p>Ethiopia – EWTI SMART Centre (starting)</p> <p>Location; Addis Abeba Host organisation; Ethiopia Water Technology Institute Start of centre: 2020 Number of people: 2 Manager: Tekle Gochem E-mail: t.gochem@yahoo.com Tel: +251911366035 Website: https://www.eweti-ethiopia.com/</p>	
<p>Kenya - ACK SMART Centre (starting)</p> <p>Location; Kisii Host organisation; Aqua Clara Start of centre: 2020 Number of people; 2 Manager: John Nyagwencha E-mail: jnyagwencha@aquaclara.org Tel: +254 (0) 714 471 677 Website: https://aquaclarakenya.com/ Social media: https://www.facebook.com/aquaclarakenya/</p>	

H. Holtslag
R. Veldman
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